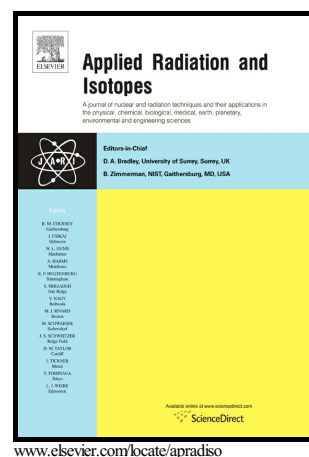


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Radiochromic film containing poly(hexa-2,4-diynylene adipate) as a radiation dosimeter

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Radiochromic film containing poly(hexa-2,4-diynylene adipate) as a radiation dosimeter**Yasser S. Soliman*¹, Atef A. Abdel-Fattah¹, Turki S. Alkhuraiji²**¹National Center for Radiation Research and Technology, Atomic Energy Authority, P.O. box 29

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Abstract

A radiation-sensitive polymer poly(hexa-2,4-diynylene adipate) (PHDA) was synthesized and incorporated into polyvinyl butyral films for radiation dose measurements in the 0.5 – 60 kGy range. PHDA undergoes crosslinking polymerization upon exposure to γ -rays, which changes its color from very pale yellow to deep orange-yellow. The color change is directly related to the absorbed dose. The absorption spectrum of the irradiated films features one absorption band around 500 nm with a shoulder around 465 nm. With increasing absorbed dose, the two bands grow in intensity and move towards higher wavelengths. The dosimeter is nearly insensitive to variations of the humidity in the range of 0–54% and temperature in the range of 30–45 °C during irradiation. The color intensifies after irradiation, both in the dark and in the light at room temperature, which reflects the continuing crosslinking polymerization. However, at -4 °C, the color intensity does not change with time.

Keywords: Radiochromic film, Radiation polymerization, Dosimetry, Diacetylene polyester

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